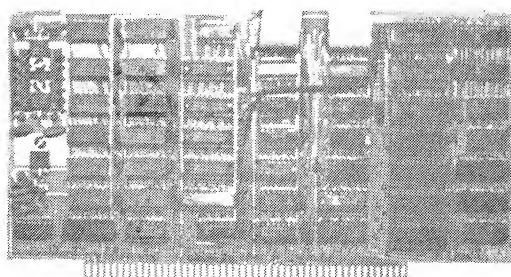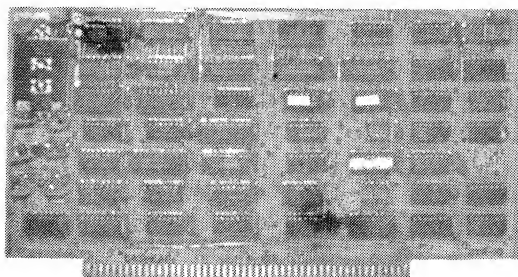# DIGITAL SOUND SYNTHESIZER

- 32 CHANNELS
- S-100
- FREQUENCY MODULATION
- UP TO 16 WAVEFORM STORAGE
- PROGRAMMABLE TIMBRE WAVEFORMS
- INDIVIDUAL CHANNEL AMPLITUDE CONTROL
- INDIVIDUAL CHANNEL FREQUENCY CONTROL
- INDIVIDUAL CHANNEL TIMBRE SELECTION

Casheab has designed and developed a 32 channel digital sound synthesizer for the S-100 bus. The synthesizer consists of two cards: a synthesizer card (SYN-10) and a controller card: (CTR-10). The S-100 processor programs the waveforms (1024 words by 12 bits) into the synthesizer. Either 4 waveforms (SYN-10/4) or 16 waveforms (SYN-10/16) can be stored. Any of the channels can use any of these waveforms. In addition attack, steady state and decay envelopes can be implemented by the processor controlling each channel's amplitude. Also the synthesizer incorporates frequency modulation which can be used for vibrato or FM synthesis.

Software on a CP/M compatible floppy disk is provided free with the purchase of the synthesizer. This software includes a waveform creation, music compiling and a real time operating program. The waveform creation software generates waveforms from user supplied frequency data. This program, written in BASIC, utilizes an FFT algorithm. A music compiler program converts music data, entered using data statements, to an executable format. The real time operating program, written in assembly language, loads the waveforms and plays the music generated from the compiler.

CASHEAB

5737 AVENIDA SANCHEZ
SAN DIEGO, CA 92124
(714) 277-2547

SYN-10/4 & CTR-10	$1095.00
SYN-10/16 & CTR-10	$1245.00
MANUAL	$5.00

NOTICE

Casheab is now producing a 32 channel digital synthesizer.
We have completed our initial production run and now are accepting
orders. A technical manual, describing the synthesizer hardware
and software, is also available.

We are increasing our price. We under estimated production
costs and low power TTL prices have stiffened. However we will
honor this introductory price on all orders received on or before
April 1, 1980. Delivery is four to six weeks after receipt of
order.

	Introductory price	Price after April 10, 1980
SYN-10/4 & CTR-10	$795.00	$1095.00
SYN-10/16 & CTR-10	$895.00	$1245.00
Manual	$5.00	$5.00

Foreign orders (outside USA & Canada) add, for shipping and handling,
$20 for synthesizer purchase and $2 for manual purchase.

CASHEAB
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MV 80

CASHEAB
MUSIC
SYNTHESIZER
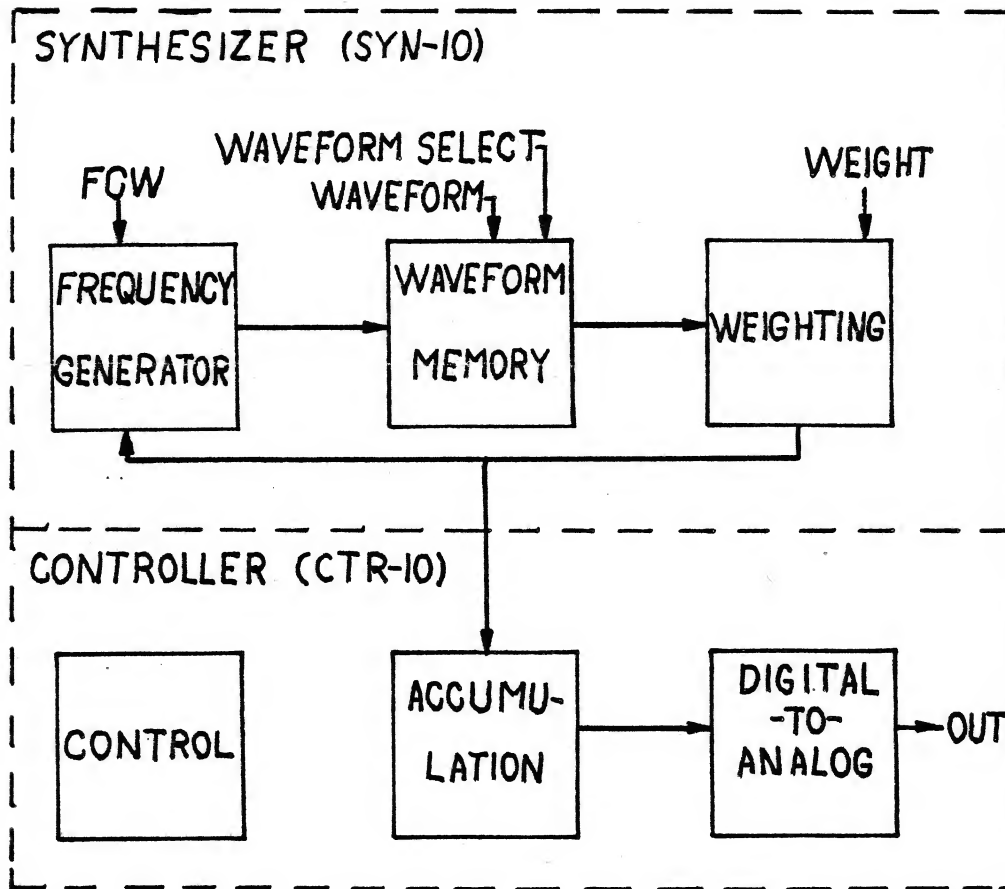
HARDWARE

The synthesizer, shown in the figure, consists of two S-100 cards on which are located the 6 fundamental parts of the synthesizer.

On the synthesizer card is located the frequency generator, the waveform section and the weighting section. The frequency generator determines the phase of each channel at each sample point. This phase depends upon the frequency control word (FCW) provided from the processor. The frequency generator recursively generates the new phase by adding the FCW to the previously phase. The phase is then passed to the waveform memory. Previously

the processor loaded and selected one of the waveforms. Here the phase is "mapped" into the timbre waveform: from the phase the waveform amplitude is determined by table lookup. Then the waveform is passed to the weighting section where a processor controlled value is used to scale the waveform. From here the digital waveform is passed to the controller card.

On the controller card is located the accumulation section, digital-to-analog converter and the control section. The accumulation section sums data for each of the 32 channels. From this sum the digital-to-analog converter generates an analog output.

SOFTWARE

Software is provided free with the purchase of the synthesizer and presently consists of waveform creation, music interpretation, and a real time control program. The software is provided on a CPM compatible 8" floppy disk. The waveform creation software is a BASIC program which allows the operator to specify frequency data. The program then creates and stores the waveform in a disk file. The music interpretation or compiling program is also a BASIC program. The program accepts data representing the music score and generates another disk file. This file is accepted by the real time control program. This program is written in assembly language. The program loads the waveforms into the synthesizer, loads the music data into the synthesizer, and then generates the music.

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